

# HISTORIC PROPERTY INVENTORY FORM

## IDENTIFICATION SECTION

**Field Site No.** 291-Z/291-Z-1 **OAHP No.** \_\_\_\_\_ **Date Recorded** 10 Nov. 1995  
**Site Name Historic** Air Filter and Exhaust Stack Revised 24 June 1998  
**Common** Ventilation Exhaust Fan House and Stack  
**Field Recorder** P.K. Hoeft, M.S. Gerber  
**Owner's Name** U.S. Department of Energy, Richland Operations Office  
**Address** P.O. Box 550  
**City/State/Zip Code** Richland, WA 99352

State of Washington, Department of Community Development  
Office of Archaeology and Historic Preservation  
111 21st Avenue Southwest, Post Office Box 48343  
Olympia, Washington 98504-8343 (206)753-4011

## Status

- ☒ Survey/Inventory  
☐ National Register  
☐ State Register  
☐ Determined Eligible  
☐ Determined Not Eligible  
☐ Other (HABS, HAER, NHL)  
☐ Local Designation

## Photography

Photography Neg. No. 91062750-157cn  
(Roll No. & Frame No.) HCRL: Roll 315, Frame 31  
View of East Facade  
Date 1991, Jan. 1998

Photo at right; Roll 315, Frame 31  
View of east facade. (Left side is top of photo.)

**Classification** ☐ District ☐ Site ☐ Building ☒ Structure ☐ Object  
**District Status** ☒ NR ☐ SR ☐ LR ☐ INV  
**Contributing** ☒ **Non-Contributing** ☐  
**District/Thematic Nomination Name** Hanford Site Manhattan Project and Cold War Era Historic District

## Description Section

### Materials & Features/Structural Types

**Building Type** Industry  
**Plan** Irregular  
**Structural System** Reinforced Concrete  
**No. of Stories** Not Applicable

### Roof Type

☐ Gable ☐ Hip  
☐ Flat ☐ Pyramidal  
☐ Monitor ☒ Other (specify) Not Applicable  
☐ Gambrel ☐ Shed

### Cladding (exterior Wall Surfaces)

- ☐ Log  
☐ Horizontal Wood Siding  
    ☐ Rustic/Drop  
    ☐ Clapboard  
☐ Wood Shingle  
☐ Board and Batten  
☐ Vertical Board  
☐ Asbestos/Asphalt  
☐ Brick  
☐ Stone  
☐ Stucco  
☐ Terra Cotta  
☒ Concrete/Concrete Block  
☐ Vinyl/Aluminum Siding  
☐ Metal (specify) \_\_\_\_\_  
☐ Other (specify) \_\_\_\_\_

### Roof Material

☐ Wood Shingle  
☐ Wood Shake  
☐ Composition  
☐ Slate  
☐ Tar/Built-up  
☐ Tile  
☐ Metal (specify) \_\_\_\_\_  
☒ Other (specify) Reinforced Concrete  
☐ Not visible

### Foundation

☐ Log ☐ Concrete  
☐ Post & Pier ☐ Block  
☐ Stone ☐ Poured  
☐ Brick ☐ Other (specify) \_\_\_\_\_  
☒ Not visible

## Integrity

(Include detailed description in  
**Description of Physical Appearance**)

	Intact	Slight	Moderate	Extensive
Changes to plan	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Changes to windows	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Changes to original cladding	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Changes to interior	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Other (specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## LOCATION SECTION

**Address** Building 291-Z, 200 West Area  
**City/Town/County/Zip Code** Richland/Benton County/99352  
**Twp 12N Range 25E Section 1 I/4 Section SW 1/4 1/4 Sec SE**  
**Tax No./Parcel No.** \_\_\_\_\_ **Acreage** \_\_\_\_\_  
**Quadrangle or map name** Riverland, Washington Quad. - 7.5 min series 1986  
**UTM References Zone** \_\_\_\_\_ **Easting** 298230 **Northing** 5158280  
**Plat/Block/Lot** \_\_\_\_\_  
**Supplemental Map(s)** \_\_\_\_\_



## High Styles/Forms (Check one or more of the following)

- |   |   |
|---|---|
| <input type="checkbox"/> Greek Revival            | <input type="checkbox"/> Spanish Colonial Revival/Mediterranean |
| <input type="checkbox"/> Gothic Revival           | <input type="checkbox"/> Tudor Revival                          |
| <input type="checkbox"/> Italianate               | <input type="checkbox"/> Craftsman/Arts & Crafts                |
| <input type="checkbox"/> Second Empire            | <input type="checkbox"/> Bungalow                               |
| <input type="checkbox"/> Romanesque Revival       | <input type="checkbox"/> Prairie Style                          |
| <input type="checkbox"/> Stick Style              | <input type="checkbox"/> Art Deco/Art Moderne                   |
| <input type="checkbox"/> Queen Anne               | <input type="checkbox"/> Rustic Style                           |
| <input type="checkbox"/> Shingle Style            | <input type="checkbox"/> International Style                    |
| <input type="checkbox"/> Colonial Revival         | <input type="checkbox"/> Northwest Style                        |
| <input type="checkbox"/> Beaux Arts/Neoclassical  | <input type="checkbox"/> Commercial Vernacular                  |
| <input type="checkbox"/> Chicago/Commercial Style | <input type="checkbox"/> Residential Vernacular (see below)     |
| <input type="checkbox"/> American Foursquare      | <input checked="" type="checkbox"/> Other (specify)             |
| <input type="checkbox"/> Mission Revival          | <u>Industrial Vernacular</u>                                    |

## Vernacular House Types

- |   |   |
|---|---|
| <input type="checkbox"/> Gable Front          | <input type="checkbox"/> Cross Gable      |
| <input type="checkbox"/> Gable Front and Wing | <input type="checkbox"/> Pyramidal/Hipped |
| <input type="checkbox"/> Side Gable           | <input type="checkbox"/> Other (specify)  |

## NARRATIVE SECTION

### Study Unit Themes (check one or more of the following)

☐ Agriculture  
☐ Architecture/Landscape Architecture  
☐ Arts  
☐ Commerce  
☐ Communications  
☐ Community Planning/Development

☐ Conservation  
☐ Education  
☐ Entertainment/Recreation  
☐ Ethnic Heritage (specify) \_\_\_\_\_  
☐ Health/Medicine  
☐ Manufacturing/Industry  
☐ Military

☐ Politics/Government/Law  
☐ Religion  
☒ Science & Engineering  
☐ Social Movements/Organizations  
☐ Transportation  
☒ Other (specify) Cold War Era  
☒ **Study Unit Sub-Theme(s)** Plutonium Finishing, Operations Support, Waste Management (Air)

### Statement of Significance

Date of Construction 1948-1949 Architect/Engineer/Builder General Electric Hanford Company/U.S. Atomic Energy Commission

☒ In the opinion of the surveyor, this property appears to meet the criteria of the National Register of Historic Places.

☒ In the opinion of the surveyor, this property is located in a potential historic district (National and/or local).

The 291-Z Air Filter Building and 291-Z-1 Exhaust Stack were constructed as part of the original Plutonium Finishing Plant (PFP) complex (also known as the 234-5Z Building). The function of the facility was to protect Hanford Site employees and the general public from exposure to gaseous effluents created and released during plant operations. This was accomplished by treating the gases before they were released into the air through the 291-Z-1 Exhaust Stack. The 291-Z facilities still function today to circulate and exhaust treated gaseous effluents from the PFP complex.

Fans in the 291-Z Building drew gaseous effluents from the 234-5Z (PFP) Building through a main duct (plenum) to the 291-Z-1 Exhaust Stack. This process used electric motor-driven fans. Two automatic steam-driven fans were also available as a standby in case of an electrical power failure. Later, it was found that by increasing the velocity of air, the dilution of air would also increase, therefore, fans of greater capacities (40,000 cfms) were installed which allowed for 60,000 cfm when two fans operated together. Currently the system consists of four fans operating at 290,000 cfms with three additional fans as reserve standby and two emergency steam turbines.

The importance of the 291-Z building and 291-Z-1 stack is that it was part of the original complex supporting operation of the Plutonium Finishing Plant. In addition, 291-Z facilities protected Hanford Site employees and the general public from exposure to waste gases. It is therefore the conclusion of the U.S. Department of Energy that the 291-Z facilities are eligible for inclusion in the National Register of Historic Places under Criterion A as a contributing property within the Hanford Site Manhattan Project and Cold War Era Historic District.

### Description of Physical Appearance

The 291-Z Building, also known as the exhaust fan house, is an irregular-shaped, reinforced concrete structure with approximate measurements of 143 feet long by 74 feet wide by 23 feet in height (only 4 feet of which is above ground). The facility has one inlet plenum (136 feet long by 15 feet wide by 20 feet deep) which runs the length of the 291-Z building, dividing it into two sections. On each side of the inlet plenum is a fan room with a discharge plenum below. The fan rooms contain electric fans and an emergency steam-driven fan. The east and west exhaust plenums are combined and discharge to the 291-Z-1 Exhaust Stack. In addition, the east section of the 291-Z Building contains a switchgear room (252-Z-2) containing 13.8 kV/440 V transformers. South of the switchgear room is a mechanical room containing air compressors, sample vacuum pumps and a sump.

The 291-Z-1 Exhaust Stack is adjacent to the 291-Z Building and separated by an expansion joint. The stack is 200 feet high and constructed of reinforced concrete with a concrete footing block foundation. The stack diameter tapers inward from the base to the top; the interior diameter at the top of the stack is 13.6 feet compared with the diameter at the base of the stack which is 16 feet. The wall thickness also varies from 6 inches at the top to 9 inches at the base. The interior of the top of the stack contains an acid-proof brick lining. A continuous air monitor (CAM) and a record sampling system are located at the 50 feet level of the stack to monitor exhaust air released through the stack.

Equipment in the facilities has been changed many times to provide additional capacities and to replace corroded equipment. Ductwork and piping in the lower part of the stack also has been changed and upgraded. Between 1962 and 1964, connections were made to the 232-Z Waste Incinerator Facility, 236-Z Plutonium Reclamation Facility, and 242-Z Waste Treatment Facility. The 232-Z Building has since been isolated from 291-Z facilities and is equipped with its own ventilation and exhaust system.

See Continuation Sheet

**Historic Property Inventory Form Continuation Sheet: 291-Z**

**Major Bibliographic References**

Nelson-Maki, Britta (BWHC). June 1998. Personal Communication. Richland, Washington.

Westinghouse Hanford Company. 1995. *Plutonium Finishing Plant Final Safety Analysis Report* . WHC-SD-CP-SAR-021. Richland, Washington.